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File: USPT

Nov 2, 1999

DOCUMENT-IDENTIFIER: US 5975633 A

TITLE: Motor vehicle seat

Abstract Text (1):

A motor vehicle seat with mutually movable side supports of seat components adjustable by an adjusting device. As the state of movement of the vehicle can be detected by a detecting device, allowing the adjuster to control at least one side support via an actuator in such a way that, during lateral acceleration during travel the seat user is automatically relieved of stress, a motor vehicle seat is provided which effects a dynamic seat adjustment for the user dependently upon the prevailing state of movement and thus makes him/her more comfortable.

Brief Summary Text (1):

The invention relates to a motor vehicle seat with side supports of seat components which are arranged so as to be movable relative to one another and which are adjustable by means of an adjusting device. These components form adjustable seat contours.

Brief Summary Text (2):

Known seats have a number of static adjusting capabilities in order to adapt the seat position and the seat contour to the individual dimensions of the occupant's body. Adjustable shoulder supports in the shoulder region are known which permit the shoulder region to be turned around the transverse axis of the vehicle.

Brief Summary Text (3):

If the vehicle is driven through a curve, the occupant is urged out of the seat away from the curve midpoint. Known solutions to this problem provide, as auxiliary support, side supports in the lower region of the seatrest but these cannot effectively support the relatively large masses of the occupant's upper body and head. In addition to this, with these known embodiments, high local pressure occurs on the side support because the contour of the occupant's back and the contour of the seatrest when loaded transversely to the direction of movement are very different from one another. An additional problem for the driver is that, when driving round a curve, he loses the contact with the shoulder region of the seat on the side away from the curve midpoint because of the steering motion, whilst on the other side of the seat-rest movement is restricted because the shoulder region hampers backwards movement of the shoulder and elbow region.

Brief Summary Text (4):

Proceeding from this state of the art, the object under-lying the invention is to provide a motor vehicle seat which, in dependence on the respective state of motion and acceleration permits dynamic adaptation of the seat for the seat user and therefore alleviates the load on him. An object along these lines is achieved by a motor vehicle seat comprising the features of claim 1.

Brief Summary Text (5):

Because of the fact that, according to the characterising part of claim 1, the state of motion of the vehicle may be detected by means of a detection device which causes the adjusting device to control at least one side support, via at least one actuator, in such a way that, when there is transverse acceleration during the

driving process, the load on the seat user is alleviated, a motor vehicle seat is provided which, in dependence on the state of side acceleration, permits dynamic adaptation of the respective side support, especially of a shoulder support surface for the seat user and alleviates the load on him.

Brief Summary Text (6):

Thus it is possible for the contact area of the occupant's shoulders to follow the occupant's body and steering motion when driving round curves, an additional support being possible in the lower region of the seat-rest during side acceleration. In addition, it is possible to create additional movement space for the driver when driving round curves by turning away the shoulder rest on the side of the seat facing the curve midpoint.

Brief Summary Text (7):

Further advantageous embodiments of the motor vehicle seat according to the invention are the subject matter of the subclaims.

Brief Summary Text (8):

The dynamic adjusting device described in greater detail below is suitable not only for the backrest of a motor vehicle seat but, rather, can also be used additionally or alternatively for the seat portion or the headrest.

Drawing Description Text (1):

An embodiment of the motor vehicle seat with adjusting device is described in greater detail below with reference to a backrest according to the drawing.

Detailed Description Text (1):

In FIG. 1 a backrest 10 of a motor vehicle seat, not shown in greater detail, is shown in a basic schematic view, seen from the front. The backrest can have centrally a rigid or movable backrest region 12 as well as a side support 14 on each side at the edge. To adjust the side support 14, there is provided in each case, in the region of the backrest 12 and at the edge, an adjusting device indicated in its entirety as 16.

Detailed Description Text (2):

In addition, there is provided a detection device, not shown in detail, which has acceleration sensors and/or movement sensors, especially to detect the acceleration forces on the vehicle or the turning angle of the steering wheel, respectively, and which transmits its measurement data to an electronic evaluation and control unit which causes the adjusting device 16 to control, via individual actuators such as a servomotor 18, at least one side support 14 in such a way that whilst the vehicle is being driven there is automatic alleviation of the load on the seat user.

Detailed Description Text (3):

Thus continuous adaptation of the side support 14, respectively provided for this purpose, in dependence on the vehicle acceleration occurring and/or the amount of the turning angle of the steering wheel, is possible, the relevant side support returning to an initial position by means of the adjusting device 16 or a spring storage device, for example in the case where the state of motion of the vehicle is zero, i.e. the vehicle is stationary. The adjusting device 16, shown in detail below, is suitable not only for use in backrests but can also be used correspondingly for the seat portion or for headrests as an integrated component of the backrest or for headrests as independent motor vehicle seat components. By preference, provision is made for the adjusting device 16, during transverse acceleration in the respective curve direction, to control the side support 14 of the backrest 10 lying on the outside in the direction of the curve.

Detailed Description Text (4):

It has proved particularly advantageous to divide both the side supports 14 of the backrest 10 into two, the upper portion 20 of the respective side support 14 having

a shoulder support 22 adapted to the shoulder contour of the seat user, and the lower portion 24 of the respective side support 14 synchronously following the movement of the upper portion 20. The shoulder support 22, as FIG. 1 indicates, can be arranged so as to be rotatable around a swivel axis 26 inclined towards the upper end of the backrest 10, the two swivel axes 26 meeting one another at an acute angle in a hypothetical extension above the backrest 10. The surfaces of the shoulder support 22 facing the seat user are chosen to be of an appropriate area for acting effectively on the shoulder contour. At their lower region, the swivel axes 26 become rotational axes 28 which run vertically, viewed looking towards FIG. 1. The lower portion 24 of the respective side support 14 is arranged so as to be rotatable around the respective rotational axis 28.

Detailed Description Text (5):

However, by preference, provision is made, as with the present embodiment according to FIGS. 1 to 4, for all the portions 20, 24 of the two side supports 14 to be arranged so that they may be swivelled around a common central swivel axis 30, it being possible to provide, at least partially also on a further development along these lines, the possibility of an adjustment movement in respect of the seat user via the swivel or rotational axes 26, 28. In addition, in a relevant development of the invention, these swivel or rotational axes (26, 28) can become boundary lines which limit the swivel movement.

Detailed Description Text (10):

If the control toothed wheels 36, 38 are moved clockwise via the drive shaft 34, the control cam 40 pushes the first control bar 44 from its position as shown in FIG. 2 into a tilted forward position according to the representation in FIG. 3. Hence, a seat user will receive support on the right side of his body when he is driving his vehicle round a left-hand curve. In the opposite direction of rotation of the drive mechanism 32, on the other hand, the second control bar 46 is correspondingly controlled and pushed forward via the lower control cam 42.

Detailed Description Text (12):

Re-setting the respective side support 14 can be effected via the body force of the seat user on unforced contact with the seat upholstery portions 50 or, as is shown in FIG. 4, via a spring system 52 with tension springs 54 which are connected to one another via coupling rods 56 and also connected at the rear with the seat upholstery portions 50 to be adjusted, in particular with the lower portion 24 of the respective side cheek 14. The lower portions 24 of the side support 14 can here be arranged with their seat upholstery portions 50 towards the interior of the seat-rest 10 on shells 58 of the motor vehicle seat, which, when the respective tension springs 54 have been drawn together, are moved back from their extended position on the lefthand side looking towards FIG. 4 into their basic position, wherein then a free edge region of the shell 58 engages in a receiving space 60 of the housing-like skeletal structure of the seat 62.

Detailed Description Text (13):

With the motor vehicle seat according to the invention it is possible to employ the side supports effectively to hold the upper body in the driving position, especially during transverse acceleration. Care is here taken to ensure that the forces acting on the body are absorbed as near as possible to the impact point of the force. Otherwise, where the support is displaced, as is the case with known solutions of this problem, greater muscle and limb stress occurs in more distant regions of the body, such stress being avoided with the present solution.

CLAIMS:

1. A vehicle seat for a motor vehicle, comprising side supports movable relative to one another and adjustable by an adjusting device, wherein a state of motion of the motor vehicle is detectable by a detection device which causes the adjusting device to control, via at least one actuator, a selected side support such that a load on

a seat user is alleviated when transverse acceleration occurs during driving, wherein said actuator comprises a servo-motor.

2. The vehicle seat according to claim 1 wherein control of the selected side support is a function of acceleration of the motor vehicle.

3. The vehicle seat according to claim 1 wherein control of the selected side support is a function of a turning angle of a steering wheel.

4. The vehicle seat according to claim 1 wherein control of the selected side support is a function of the speed of the motor vehicle.

5. The vehicle seat according to claim 1 wherein the adjusting device returns the selected side support to an initial position.

6. The vehicle seat according to claim 1 wherein a spring storage device returns the selected side support to an initial position.

7. The vehicle seat according to claim 1 wherein the selected side support is a portion of a seat.

8. The vehicle seat according to claim 1 wherein the selected side support is a portion of a headrest.

9. The vehicle seat according to claim 1 wherein the detection device includes an acceleration sensor.

10. The vehicle seat according to claim 1 wherein the detection device includes a sensor to detect a turning angle of a steering wheel.

11. The vehicle seat according to claim 1 wherein the actuator comprises a servo-working cylinder.

12. The vehicle seat according to claim 1 wherein the actuator comprises a mechanical adjusting member.

13. The vehicle seat according to claim 1 wherein the actuator comprises coupled gears.

14. The vehicle seat according to claim 1 wherein the actuator comprises cam and eccentric drives.

15. The vehicle seat according to claim 1 wherein the actuator comprises a spring system with adjustable spring stiffness.

16. The vehicle seat according to claim 1 wherein when a transverse movement in a curve direction occurs, the adjusting device controls a selected side support.

17. The vehicle seat according to claim 1 wherein the parameters of the movement of the selected side support may be adjusted individually by the seat user.

18. The vehicle seat according to claim 1 wherein the adjusting device may be manually operated.

19. The vehicle seat according to claim 1 wherein the selected side support is a portion of a backrest.

20. The vehicle seat according to claim 19 wherein the backrest includes two side supports and an upper portion of the side support has a shoulder contour adapted to the shoulder contour of the seat user and a lower portion of the side support

follows synchronously the movement of the upper portion, and in that the ratio of the largest to the smallest effective width of the side support assumes a value of at least 1 to 1.5.

21. The vehicle seat according to claim 20 wherein associated with each side support of the backrest there is provided a drive unit which controls the lower portion and the upper portion of each side support via a drive mechanism.

22. A vehicle seat for a motor vehicle, comprising side supports movable relative to one another and adjustable by an adjusting device, wherein a state of motion of the motor vehicle is detectable by a detection device which causes the adjusting device to control, via at least one actuator, a selected side support such that a load on a seat user is alleviated when transverse acceleration occurs during driving;

wherein the actuator comprises a servo-working cylinder.

23. A vehicle seat for a motor vehicle, comprising side supports movable relative to one another and adjustable by an adjusting device, wherein a state of motion of the motor vehicle is detectable by a detection device which causes the adjusting device to control, via at least one actuator, a selected side support such that a load on a seat user is alleviated when transverse acceleration occurs during driving;

wherein the actuator comprises cam and eccentric drives.